EFFECT OF ECOLOGICAL LITERACY THROUGH PLACE BASED LEARNING ON SUSTAINABLE LIFESTYLE OF PUPIL TEACHERS

Synopsis

Submitted in the partial fulfillment for the requirement of

DOCTOR OF PHILOSOPHY

In

FOUNDATION OF EDUCATION

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2022

1.0.0 INTRODUCTION

“When schools disconnect from specific places and life in communities, they cease to be public institutions, serving the public good.”

— John McPhee

Sustainable development (SD) is a concept that aims to preserve life on Earth while also maintaining a good standard of living for current and future generations. It is founded on the concepts of natural resource conservation, responsible consumption, and ethical corporate practises, and it addresses today's global concerns. The shift to SD necessitates a rethinking of existing values in society's economy, environment, and social life.

The core belief is that a sustainable society cannot be achieved without a change in human consciousness where individual priorities and values need to be transformed. Generally, the responsibility for changing consciousness is on the individual, and therefore decision making is inherently decentralised and large-scale political activity in support of an ecological worldview is impractical. Education is crucial in this respect since it is responsible for the moulding of young people's attitudes as well as progress in the transformation of formal and informal institutional structures.

Many of the differences between ' development' and 'lifestyle' can be seen in the differences of 'Having versus Being'. Development is considered to be successful when people have the necessary material goods such as food, water, clothing, housing, health, education, and transport. This does reflect a very Western view of life where the sign of fulfilment or success is when you have all the 'right stuff. The other side of human life is that of 'being’. This side of life is about the people we are, the relationships we share, how we maintain those relationships, and what aspects of life we consider to give us a sense of meaning and purpose. Under this banner are issues of culture, religion, history, and the customs and celebrations that help remind us of who we are and what is important to us.

We foresee a future plan of education which have clearly defined objectives - not of growth and aggrandisement through expansion, domination and competition, but of sufficiency, equity and security founded on cooperation rather than competitiveness; participation rather than to ken consultation, oppression or exclusion; empowerment rather than deprivation and dispossession; and self-reliance rather than dependence" (Reid 1995: 155).

The concept of 'deep ecology' came from the writings of the Norwegian philosopher Arne Naess. Deep ecology is seen as biocentric while mainstream sustainable development is seen as 'shallow ecology'. The basis of deep ecology is that the natural world has intrinsic value and we should care for it not simply because this may be of benefit to us. Shallow ecology is concerned about the value of nature only for the human species. Ecological Literacy envisions the idea of developing a deep ecological insight among the next generation. This insight could naturally be imbibed through an experiential classroom experience.

Ecological literacy also determines the lifestyles we choose – or, in some circumstances, are compelled to choose which in turn has a significant influence on our world, impacting everything from economic growth to environmental health. The vision is to create a world that is sustainable and affluent in several ways. The challenge for the twenty first century is to create that world.

PLACE BASED LEARNING

According to (Gruenewald, 2003). Place based pedagogy is defined as " An essential approach that needs to be synthesized into education pedagogy, theory, research and policy, given that its practice affects the social and ecological places that people inhabit"

Place-Based Education is a method of connecting learning and communities with the major aims of enhancing student involvement, improving academic achievements, influencing communities, and developing global awareness. Place-based learning experiences have many other advantages in addition to these aims. Students, teachers, families, communities, and society may all benefit from these benefits.

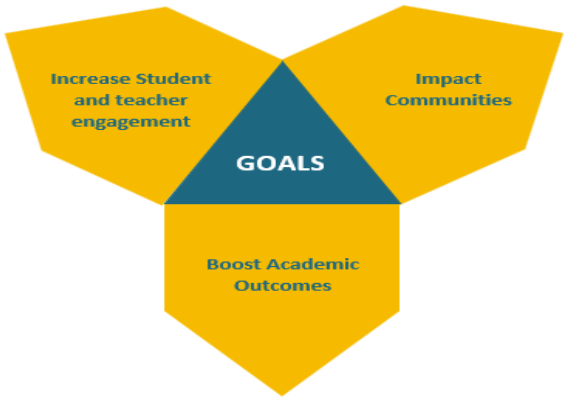

Fig. no. 1- Goals
(Source- Michael Young (2015) "What is Place Based Education and Why Does it Matter")

The core principle of place-based learning is to take learning experiences outside of school into local communities and thereby make student learning more relevant (Gruenewald, 2003a). Grunewald and Smith (2014, p. xvi) state that place-based learning is "a community-based effort to reimagine the process of education, culture and human development for the good of community life".

Place-based learning emphasizes the concept of immersing students in local event. It aims to make learning meaningful and relevant because it draws on local events as a source of learners.

Place-based learning (PBE) is one way of teaching about nature and involving the student in its environment. It has been shown to enhance students' cognitive abilities, and their affective, and social learning. Most importantly, it has been shown to provide greater motivation and attitude change in teachers than traditional teaching methods.

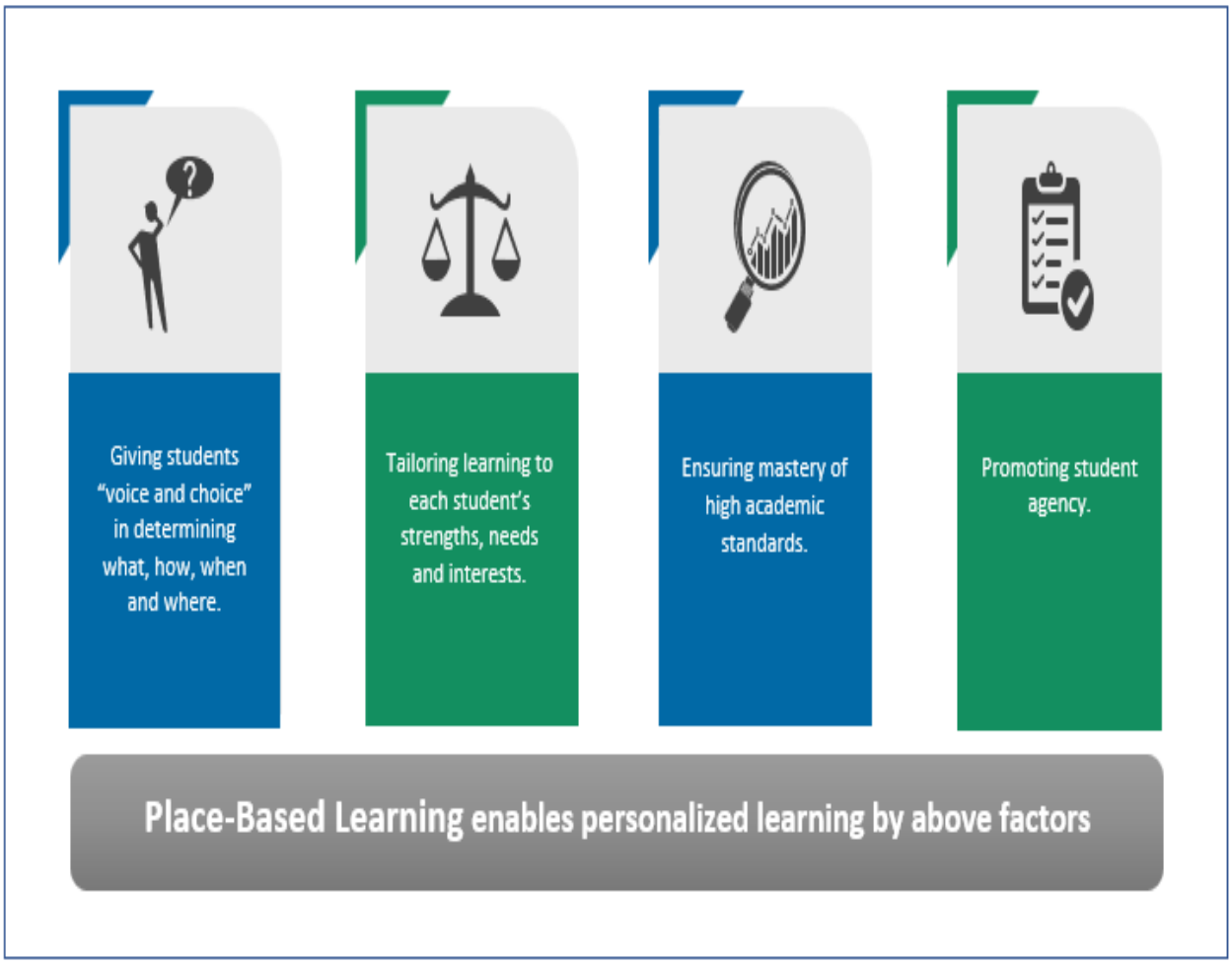
Giving students "voice and choice" in determining what, how, when and where.
Tailoring learning to each student's strengths, needs and interests.
Ensuring mastery of high academic standards.
Promoting student agency.
Place-Based Learning enables personalized learning by above factors

Fig. no. 2 – Place-Based Learning
(Source- Michael Young (2015) "What is Place Based Education and Why Does it Matter")

The term "place-based learning" has been used in various ways. This technique, according to Russell-Ciardi (2006), is an educational strategy that employs a local context for teaching and learning. The history of society and the environment, folk culture, social concerns, the economics, and aesthetics are all on the table in this approach (Sobel, 2004). This method emphasises on providing students with useful job experiences and incorporating local concerns and expertise into the curriculum (Smith and Sobel, 2011). Various titles for this method have been used in the literature, including "outdoor education," "environmental education," "consciousness of the place," "ecological education," and "the pedagogy of the place" (Woodhouse and Knapp, 2000).This approach's titles and meanings stress the confluence of place, environment, local history, culture, and educational activities. According to the literature on place-based education, this approach (a) gives students different meanings about their place, (b) takes its source from the characteristics/dynamics of a place (e.g., geographical, political, and sociological), (c) encourages students to develop knowledge rather than use knowledge, (d) increases the permeability of boundaries between schools and society, and (e) is multidisciplinary and interdisciplinary despite the fact that it is multidisciplinary and interdisciplinary despite the fact that it (Woodhouse and Knapp, 2000; Smith, 2002; Sobel, 2004). Educators have created a variety of resources and applications for subjects, concepts, and abilities to be taught both within and outside the classroom as part of place-based education. Place-based education's learning process (a) takes place in the schoolyard, local culture, and environment, (b) focuses on local themes, systems, and content, (c) is personal to the students, and (d) takes care to contribute to the community's power and environmental quality as a result of experiences. Experimental learning, contextual learning, problem-based learning, constructivism, outdoor education, environment and ecological education, biological education, democratic education, multicultural education, community-based education, and critical education are all goals and practises of place-based education (Gruenewald, 2003).

IMPACT OF PLACE BASED LEARNING

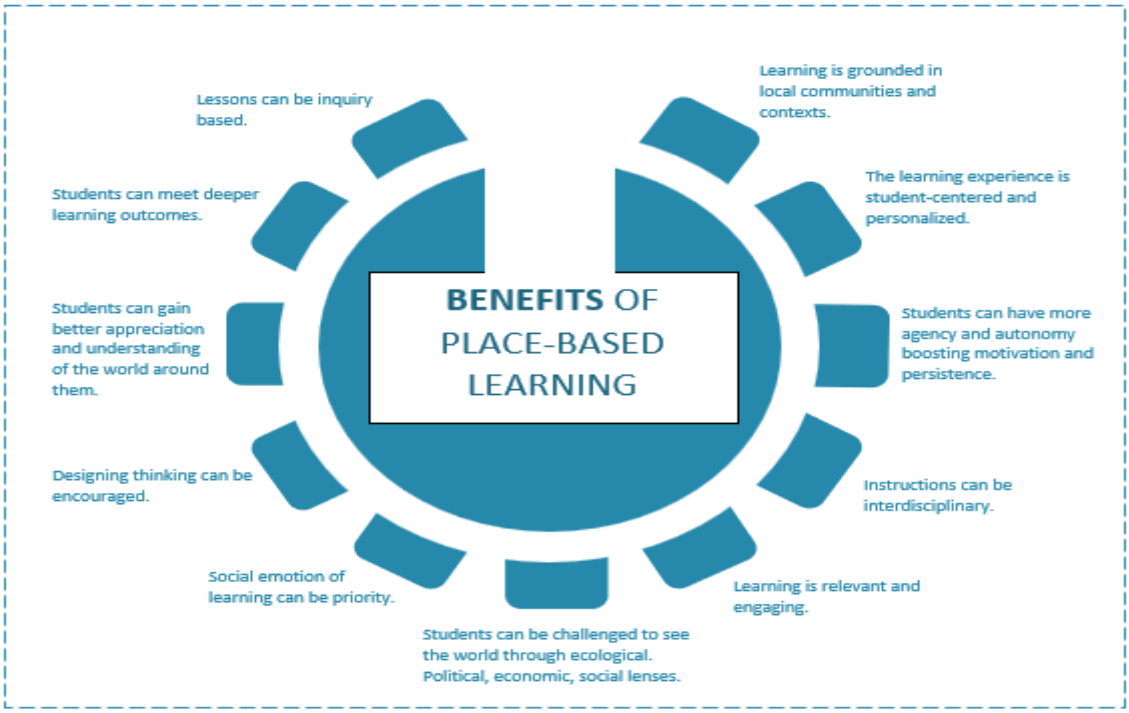
BENEFITS OF PLACE-BASED LEARNING
Lessons can be inquiry based.
Learning is grounded in local communities and contexts.
Students can meet deeper learning outcomes.
The learning experience is student-centered and personalized.
Students can gain better appreciation and understanding of the world around them.
Students can have more agency and autonomy boosting motivation and persistence.
Designing thinking can be encouraged.
Instructions can be interdisciplinary.
Social emotion of learning can be priority.
Learning is relevant and engaging.
Students can be challenged to see the world through ecological. Political, economic, social lenses.

Fig. no. 3 - Benefits of Place-Based Education
(Source- Michael Young (2015) "What is Place Based Education and Why Does it Matter")

The benefits of PBL are seen as influencing the cognitive, affective, social, moral and spiritual development of students on one hand and also transforming the pedagogical approach to the teaching-learning process.

Akbas.Y and Cakmak.S (2019) conducted project studies about local history, cultural, and socio-economic structure of their environments within the context of place-based education approach. The results showed that there was a significant difference between the pre- and post-tests mean scores of the students' problem solving and social skills. Karakus.U and Akkaya.M (2018) conducted a study to examine the effectiveness of teaching the 6th grade (12-13 years old) social studies lessons' unit ''Our Country's Resources'' by place-based teaching method on student achievement. The results showed that the students of the experiment group educated with place-based method attained the learning goals significantly higher as compared to the control group students receiving normal classroom instruction. In conclusion it is clear that place-based education method is more effective for student achievement in social studies education. Dorji, K., Kinley, Sivitskis, A (2021) conducted a case study to investigate the potential influence of place-based education on students' engagement in learning and describe the place-based education assessment practices carried out in the school. The result describes that the local

community was used as an extended part of a classroom enabling students to gain hands-on learning experiences. Other evidences towards positive influences of PBL include studies by Moody. H (2017),Bhat.D (2016), Pasiechnyk.C (2018) and Ontong.K and Grange.L (2014).

ECOLOGICAL LITERACY AND ITS IMPORTANCE

Ecological literacy is an individual's sufficient knowledge and understanding, skills and attitude towards natural systems that make life on earth possible. There are two aspects of ecological literacy i.e. ecological knowledge & understanding and attitude towards ecology and environment. a) Ecological knowledge & understanding – It is related to the knowledge of ecological concepts, understanding of environmental issues and relating it to human interaction. b) Attitude towards ecology and environment – It is an enduring combination of emotional, perceptual and cognitive processes with respect to some aspects of our environment. It can be defined as "intention to act" something. Ecological Literacy is grounded on the philosophy of developing individual understanding in relation to his/her physical, social, psychological and internal environment. It connects the individual with his/her community and develops concern and sensitivities towards global issues. Further, the products of Ecological Literacy lead to skills such as; practical competence, learning how to co-exist and care, and biological knowledge and ecological understanding. Hammarsten et al. (2019)

Christinawati (2018) conducted a study to explore how to guide people in recognising the importance of caring for the environment so that future generations can maintain the balance of life between people and their surroundings. The study concluded that ecological neglect as portrayed in the poems actually exists in real life. However, modern living leads people not to have willingness to live together with nature as well as take for granted their environment. Modern living also demands all practicality and convenience requiring people to use time as efficient as possible for productive activities.

Lewinsohn.T, Attayde.J, Fonseca.C, Ganade.G, Jorge.L, Kollmann.J, Gerhard E. Overbeck, Prado.P, Pillar.V, Popp.D, Rocha.P, Silva.W, Spiekermann.A, Weisser.W (2014) proposed problem based learning to improve the understanding of ecological science and its usefulness for real-world environmental issues that professionals in careers as diverse as engineering, public health, architecture, social sciences, or management will address. They highlighted a critical but often overlooked demand on ecological literacy: to enable professionals of various careers to apply scientific knowledge when

faced with environmental problems. Yildirim (2013) conducted a study on ecological literacy for a sustainable future: proposal of an eco-sociological model. The Study represented that people need to have the knowledge of ecological principles, concerns for a healthy natural environment and skills to engage in environmentally responsible behaviours. This study explains how ecological literacy influences the creation of a sustainable environment/future and suggests an "Eco-Sociological Model" established by N. Stanger as a model for teaching ecological literacy in schools.

SUSTAINABLE LIFESTYLES

Sustainable lifestyle is an ever-changing manner of life that affects individuals in both developed and developing countries. It is the notion that everyone on the planet contributes to the world's economic, social, environmental, and cultural well-being. It encourages people to make lifestyle choices based on how those choices will affect the natural and social systems in which they live. It is a way of living that considers the future and future generations, and recognises that people today are more linked than ever before, and that one person's or group's activities have the capacity to influence the lifestyles of others.

"Sustainability is a community's control of capital, in all its forms - natural, human, human-created, social, and cultural - to ensure to the degree possible that present and future generations can attain a high degree of economic security and achieve democracy while maintaining the integrity of the ecological systems upon which all life and production depend" (Trzyna and Osborn 1995: 37).

The present concept of sustainable lifestyle has evolved out of sustainable development theory and practice.

Sustainable development moved from focusing on the environmental impact of development to understanding that there are wider social, economic and cultural aspects to development that are just as vital. Thinking in the development area also began to note the importance of the lifestyle choices of people in developed countries and their impact on the ability of developing countries to provide basic necessities for themselves. The understanding that the world is now a 'global village' impacts the lifestyle choices. Sustainable lifestyle values have been promoted for at least two thousand years. All religious leaders have dwelt upon the difference between material and spiritual riches. They all agreed on the emptiness of materialism as an ethical precept. They all believed that 'the pursuit of material wealth is a

wrong aim' and that 'we should aim only at the minimum wealth needed to maintain life. (Brown 1981: 351).

Gandhiji is perhaps one of the most well-known modern-day proponents of the concept that encourages people to behave in such a manner that everyone benefits. He believed that wealth would lead to cultural decay and moral bankruptcy (Sider 1981: 73). There was also a concern, particularly among environmentalists, that industrialisation and Western lifestyles were having a destructive effect on the environment both in developed and developing countries (Adams 1990: 29).

This emphasises the many perspectives on what it takes to be sustainable. There were attempts in the 1970s to create global models of probable world growth scenarios. The most famous model for the 'Club of Rome' was created by a team from the Massachusetts Institute of Technology. This was an international organisation that was founded with the support of European multinational corporations. (Adams 1990: 29). They attempted to review the problem of the global environment by using a computer model of the world, encompassing its population, resources, food supply, technology etc. Their first report was entitled 'The Limits to Growth' and gave some startling and gloomy conclusions of the collapse of global environmental systems and massive famine resulting. They believed that even with the introduction of technological improvements, increasing non-renewable resources, and controlling population growth, there was only a prolonging of the inevitable using the model (Adams 1990: 29).

In 1991 the IUCN published the policy statement 'Caring for the Earth'. This statement saw a shift from conservation ethics to 'sustainable living' (IUCN and UNEP and WWF 1991: 13 - 17). The statement emphasised that improving the quality of human life concerned more than just material welfare and would be achieved if certain 'virtually universal' goals were met. These goals included a long, healthy life, education, access to resources for a decent standard of living, political freedom, guaranteed human rights and freedom from violence. (Reid 1995: 55).

The terms voluntary simplicity (Durning 1990), sustainable living (Caring for the Earth 1991), conserver society (Trainer 1995), sustainable livelihoods (Chambers 1995) and sustainable society (Beaumont 1997 and Milbrath 1989) are similar in their meaning and practical outworking as that of sustainable lifestyles. The term 'sustainable lifestyles' is therefore a certain way of describing a lifestyle that the terms above refer to.

Understanding what a sustainable lifestyle is can be evaluated on two levels. Firstly, there is the wider level of systems, processes and dominant values and secondly, the practical level of how a sustainable lifestyle is lived out. In both spheres the two key parts of a sustainable lifestyle is valuing people and valuing the earth. For this to occur requires a change in understanding and lifestyle. "Sustainable living must be the new pattern for all levels: individuals, communities, nations and the world. To adopt the new pattern will require a significant change in the attitudes and practices of many people"
(IUCN / UNEP / WWF 1991 :5).

Denis Goulet details six elements that he believes are necessary for a sustainable lifestyle to occur and that also need to have a change in attitudes and practices. Each of them has direct impact upon people and their ability to live fulfilling and sustainable lives.

• *Economic Component* - dealing with the creation of wealth and improved conditions of material life, equitably distributed

• *Social Ingredient* - measured as well-being in health, education, housing and employment

• *Political Dimension* - embracing such values as human rights, political freedom, legal enfranchisement of persons, and some form of democracy

• *Cultural Element* - in recognition of the fact that cultures confer identity and self-worth to people

• *Ecological Soundness*

• *Full-Life Paradigm* - refers to meaning systems, symbols, and beliefs concerning the ultimate meaning of life and history

(Goulet in Trzyna and Osborn 1995: 51)

He notes five ways in which a sustainable society must differ from an unsustainable paradigm. These include:

• Its conception of progress

• Its regard for the natural world

• Its respect for humans and its valuation of human potential

• Its conception of wealth

• Its view of economic activity

(Reid 1995: 155)

A sustainable society will aim for each person's right to fulfil his or her needs and on the provision of equal opportunities for all to develop their abilities and it will allocate resources accordingly. This would have to be based on an acceptance of the need for more equitable distribution both nationally and internationally because of an understanding that there is only a finite amount of resources and wealth to be shared. Wealth would have a different understanding than it presently does. Money may be a useful means of exchange and a convenient way of storing some forms of wealth. Wealth may include a wide range of goods - physical and nonphysical. They may be economic or non-economic such as health, family life, livelihoods, working conditions, income levels and income distribution, leisure, and the state of the environment and security. For this to occur would require new indicators of welfare. An example of this is the Physical Quality of Life Index, developed by the Overseas Development Council, which gives equal weight to infant mortality, life expectancy and literacy in an attempt to measure the contribution of quality of life of welfare provision and living conditions (Reid 1995: 162).

The practical out workings of a sustainable lifestyle will require changes in lifestyles. Ultimately it will require "a reduction in consumption in wealthy societies and changes in the kind of things consumed toward products that are durable, recyclable, useful, efficient, and sufficient" (Orr 1994: 62). Sustainable lifestyles therefore have the ability to influence the way people purchase goods and services. This includes the type of products, the amounts, and the way products or services are produced or dispensed. For this to occur requires living more simply, high levels of self-sufficiency and cooperation, and smallness of scale. This involves practical actions such as recycling, shopping locally, purchasing products made and shipped locally, recycling, increased use of public transport, better use of waste and waste water, better house designs and learning to consume less.

1.2.0 EMERGENCE OF THE PROBLEM

Abbas and Singh (2014) conducted a survey of environmental awareness, attitude, and participation amongst university students. Findings exhibited that a considerably large ratio of students showed high level awareness by 63.9% of the total population. On the contrary, the study also revealed that, in spite of high level of knowledge and awareness on environment there was a low level of participation in environmental activities by about 74%. In other words, results from the study imply that, students being aware about their surroundings and having knowledge about their environment might not be the only

factor to stimulate participation in environmental improvement and protection activities. The study also presented that high environmental awareness has direct relation with acquiring good attitudes and higher sense of responsibility towards environment.

McGinn (2014) conducted a study on quantifying and understanding ecological literacy: a study of first year students at liberal arts institutions. The study showed that 58 percent of students had some level of ecological literacy while the remaining students are ecologically illiterate. Hammarsten et al. (2019) conducted a study on developing ecological literacy in a forest garden: children's perspectives. It was found that dense cities, disappeared green spaces and children spend less time out doors were the conditions which created health problems and lack of ecological literacy. Okere (2012) studied environmental literacy and the emerging roles of information professionals in developing economies. The paper argued that information professionals could be more relevant to the needs of sustainable environment by repositioning themselves in terms of their roles in their various communities. Findings of these studies demonstrate that the prescribed course on environmental studies does not provide the necessary Knowledge, attitude and skill for encouraging a paradigm shift towards adoption of sustainable lifestyles.

Irianto.D ,Yunansah.H , Mulyati.T , Herlambang.Y , Setiawan.D (2020) investigated the effects of multiliteracy learning models on the ecological literacy abilities of elementary school students and discovered how students describe their experiences in learning. The results of the study indicate that the ecological literacy ability of elementary school students had increased significantly after being given learning using multiliteracy models.

Heaton.M (2020) investigated transformative place-based education as an adaptive boundary system that connects individual learning to positive social-ecological change. The research investigated that most central to transformative place-based learning experiences is real-world problem solving.The causal relationships between real-world problem solving and almost every other learning system component, including agency, change, and place, was found to be the strongest link in this study between individual learning and positive social-ecological change.

Kezang.N (2019) reported the improvement of students' learning achievement and their opinion on the use of place-based inquiry as an instructional strategy in the classroom in learning environmental science.

There are many issues that are being addressed chronologically in environmental education, mainly because of the dynamic nature of the content, classroom practices and learning principles. Many of these issues relate, at best, to the content and practices of environmental education, particularly those related to the natural environment and have low scores on the Science Education Assessment (NGSS Lead States, 2013; UNESCO, 2013; Louv, 2005; Nabhan and Trimble, 1994). Additionally, teachers often fail to incorporate lessons into and about the environment with which students interact regularly, yet many teachers feel that they are successfully incorporating those topics into their lessons. The Literature on ecological literacy, place based learning and sustainable lifestyles addresses the persistent lack of engagement with the environment among students.

Verplankan and Roy (2016) conducted a research study entitled "Empowering Interventions to Promote Sustainable Lifestyles: Testing Habit Discon's Hypothesis in a Field Experiment". In the study, an attempt was made to change the assertive behavior through intervention. As part of the experiment, 800 participants took part in a field experiment in which intervention was used to improve sustainable behaviour. Findings reveal that the intervention program is helpful in promoting sustainable lifestyles.

Sookie (2014), in her study Investigating Measurement of Consumer's Ecological Behavior, Environmental Knowledge, Healthy Food and Healthy Way of Life, attempted to find out whether consumer's environmental understanding of healthy and sustainable lifestyles, eco-friendly behavior influence healthy eating habits. The results of the study found a positive correlation between environmental understanding, healthy lifestyle and consumer's ecological behavior and healthy and appropriate food habits. Exploratory Factor Analysis (EFA) was used in statistical methods, in the findings it became clear that the above factors have a significant role in the development of a sustainable lifestyle.

Research studies and philosophical texts reveal that authentic environmental learning and the improvement of student experiences by incorporating more authentic environmental science (NGSS,

Lead States, 2013). Place-based education systems offer authentic and appropriate practices that encourage engagement with science.

The research questions arising in the mind of the researcher are-

- Does the level of ecological literacy changes after the intervention on ecological literacy through place-based learning?
- Does the level of sustainable lifestyle changes after the intervention on ecological literacy through place-based learning?
- What will be the effect of ecological literacy on sustainable lifestyle through place-based learning?

1.3.0 JUSTIFICATION OF THE PROBLEM

Education is a critical instrument for disseminating the notion of sustainable development in society, according to researchers all around the world. "Education for Sustainable Development is not only a requirement for attaining a sustainable future, but also a priority and proactive method of accomplishing it, i.e. the transition to SD begins with the construction of education for sustainable development and a new internationally sustainable consciousness. Higher education, in turn, has a unique role to play in this process.

Sharma (2014) explains that research in higher education is a crucial component for India's sustainable development in a study titled "Sustainable Development and Research in Higher Education in India." This fact has been highlighted in the form of educational institutions continuing to make excellent higher education and good research efforts in order to develop sustainable behaviour in society through education.

In their study Role of Higher Education in Sustainable Development, Jaiswal and Gupta (2014) stated that higher education plays the most essential role in establishing the notion of development. Higher education institutions have the potential to lead the way in converting the local community into a sustainable one. This endeavour can easily be fruitful if the institution and its research scientists are willing to take on this essential role.

Universities provide the institutional foundation for the execution of the notion of sustainable development in the face of escalating global economic, environmental, and social concerns. The phrase "sustainable university" is used in higher education and is described as a higher education institution (HEI) that helps to avoid negative environmental, economic, and social effects resulting from resource consumption at a regional or global level. To assist a society's transition to sustainable lifestyles, a sustainable university implements teaching, research, outreach, and collaboration roles.

Despite the fact that universities play a critical role in bringing the notion of sustainable development to life, the bulk of higher education institutions remain conventional. "Many institutions continue to fall behind the demands of businesses and governments, failing to offer society with the required help in making the transition to a more sustainable future." Secondly, the introduction of Environmental Education has failed to fulfil the long-term goal of achieving a sustainably sensitised world.

Much of the development work done in the previous fifty years has failed to provide the desired outcomes, prompting a rethinking of what development is and how it is accomplished. This provides a chance to broaden the definition of what constitutes "sustainable development." Other dimensions of development, such as social and economic consequences, started to become more important. There was also widespread discontent with and failure of both sustainable development approaches and the Western concept of what matters in life. Individuals in both the developed and developing worlds became more linked, allowing them to understand how everyone contributed to the growth of countries and people. A person's lifestyle has a direct influence on the global environment and other people's capacity to share resources and services fairly. The notion of a "sustainable lifestyle" was born out of this expanded view of growth.

As a result, a sustainable lifestyle requires individuals to live in such a manner that future generations, as well as other people, have access to resources. It also broadens the definition of development beyond economics to encompass concerns that affect people and their communities. This raises questions about what constitutes prosperity, progress, and the advantages of non-material growth.

The Dayalbagh Educational Institute has a curriculum through which environmental thinking and responsible consumption abilities are currently being shaped .Waste recycling, the usage of long-cycle products, and the utilisation of renewable resources are all taught and practised. The emphasis is on

economic activities that are environmentally friendly, energy conservation, separate garbage collection, and responsible consumption. University research programmes, administration of university operations based on resource conservation, waste collection and transformation, eco-education, and support of ecological culture are all examples of "green" development undertaken by the University. It aims to develop important eco-habits via practical actions that promote resource and energy efficiency .

The investigator wishes to further the DEI goal of promoting sustainability by conducting an experiment on creating ecological literacy through place based pedagogy which would impact the lifestyle of its students. The investigator seeks to foster a sense of place in individuals and their communities. The benefits are far-reaching and complex, but here are a few:

- Boost student achievement and confidence.
- Improve the environmental, social, and economic vitality — and long-term sustainability — of communities.
- Create vibrant partnerships between schools and communities.
- Pass on knowledge and skills that will help students take part in the democratic process.
- Encourage world citizens by learning to understand, appreciate, and care for their own communities.

This is a challenge on a societal level, with a focus on values, policies, and attitudes, as well as on a more personal level, with a focus on individual and communal acts. It definitely begs for a review of higher education's practises and curriculum in order to instil healthy, sustainable lives.

It is postulated that lifestyle changes will have an imperative effect on the future of the planet. While environmental education creates awareness about the planet, Eco-literacy is the ability to understand and think critically about the natural environment and our place within it. In order to develop a sustainable environment, we need to be able to understand the interconnectedness of all life and the impact that our actions have on the planet. Eco-literacy allows us to see the world from a holistic perspective and make informed decisions that will help to protect the environment.

Based on the literature review, the researcher proposes problem-based learning (PBL) as a way of overcoming the gap between the perception of ecology as a science and the real-world problems that the students will be exposed to as professionals. PBL is a student-centered teaching method in which the

role of the instructor is to facilitate the learning process. Hence, the researcher has proposed the following problem for study.

1.4.0 STATEMENT OF THE PROBLEM

EFFECT OF ECOLOGICAL LITERACY THROUGH PLACE BASED TEACHING ON SUSTAINABLE LIFESTYLE OF PUPIL TEACHERS

1.5.0. DEFINITIONS OF THE TERMS

1.5.1 PLACE BASED LEARNING

Place-Based Learning is defined by the Center for Place-Based Learning and Community Engagement as "place students in local heritage, cultures, landscapes, opportunities and experiences, and uses these as a foundation for the study of language arts, mathematics, social studies, science and other subjects across the curriculum." It uses places and their resources (cultural, historic, or geophysical etc.) as a foundation for learning across disciplines.

Operational definition

In thepresent study, place basedlearning will involve the out of classroom activities and real life experience, community engagement, etcwill be carried out in accordance with the modules of Ecological Literacy.

1.5.2 ECOLOGICAL LITERACY

"EL is a set of understandings, skills, attitudes, and habits of mind that empowers individuals to relate to their environment in a positive fashion, and to take day-today and long-term actions to maintain or restore sustainable relationships with other people and the biosphere. The essence of EL is the way we respond to the questions we learn to ask about our world and our relationship with it; the ways we seek and find answers to those questions; and the ways we use the answers we have found." (Roth, 2002).

Operational Definition

In the present study Ecological literacy refers to the development of Knowledge, Skills and Attitude towards the environment. It aims to develop modules based on an interrelationship and bonding of the individual with his inner and outer environment, encouraging community and social engagement, developing sensitivities,etc.The researcher will develop modules to this effect.

1.5.3 SUSTAINABLE LIFESTYLES

Sustainable Lifestyles are patterns of action and consumption, used by people to affiliate and differentiate themselves from others, which meet the basic needs, provide a better quality of life, minimize the use of natural resources and emissions of waste and pollutants over the lifecycles, and do not jeopardize the needs of future generations (Mont, 2007).

Operational Definition

In the present study, Sustainable lifestyles refer to Practices that can lead to environment friendly and ecologically responsible lifestyle through the right actions and consumption which will help to protect the environment and maintain its resources for the present and the succeeding generations. It also implies individual participation on community and social welfare activities. A tool will be developed to measure sustainable lifestyle.

A tool will be developed to measure sustainable lifestyle. Sustainable lifestyles will be measured along the following Individual parameters-

1. Food intake and preferences, Water and Energy consumption
2. Clothing and Housing: Expenditure and living preferences
3. Transport automobile mileage
4. Use of Technology (number of electronic devices bought/discarded)
5. Contact with nature, and animals (hrs/week)
6. Travel for recreation, tourism (km)
7. Experiences of beauty, cultural diversity
8. Community: participation in activities
9. Solidarity: gifts to charity, development
10. Altruism: volunteer service
11. Spirituality: daily prayer
12. Minimalism practices, etc.

1.5.4 PUPIL TEACHERS

According to English Dictionary "A pupil-teacher is a college, university or graduate student who is teaching under the supervision of a certified teacher in order to qualify for a degree in education."

Operational Definition

The study will include Pupil Teachers pursuing the B.Ed. degree in the Dayalbagh Educational Institute offering education in professional courses.

1.6.0 OBJECTIVES OF THE STUDY

1. To develop modules on ecological literacy.
2. To examine the level of ecological literacy of pupil teachers.
3. To observe and measure the sustainable lifestyle of pupil teachers.
4. To analyse the effect of ecological literacy through place-based learning on sustainable lifestyle of pupil teachers.

1.7.0 HYPOTHESIS OF THE STUDY

1. There will be significant effect of ecological literacy through place-based learning on sustainable lifestyle of Pupil Teachers.

1.8.0 LIMITATIONS OF THE STUDY

1. The study will be delimited to Agra city.
2. The study will be delimited to pupil teachers of Dayalbagh Educational Institute, Agra.
3. Only Place based learning will be employed to develop Ecological Literacy.
4. There are many other outcomes of ecological literacy, but the study is limited to its effect on sustainable lifestyle.

1.9.0 VARIABLES OF THE STUDY

In the present study, there are two variables.

i.) Independent Variable - Ecological Literacy Through PBL

ii.) Dependent variable is Sustainable Lifestyle

Independent Variables Dependent Variable

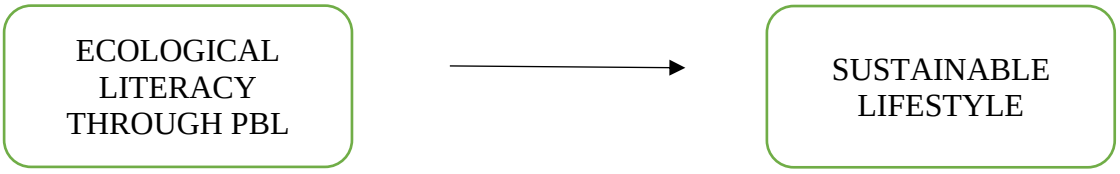

Fig No. 5 – Variables Design

1.10.0 RESEARCH METHOD & DESIGN

Research Method – The Quasi Experimental Method will be followed for the present study.

Research Design – Single group pre-post design of quasi experimental method will be used for the present study.

The Study will be a Single group pre-post quasi experimental design which is as follows-

Table 1 – Design of the study

Research Method	Groups	Test	Interventions	Test
Quasi Experimental Method	Single Group Pre-Post Design	Pre test 1. ECOLOGICAL LITERACY 2. SUSTAINABLE LIFESTYLE	Ecological literacy through PBL	Post Test 1. ECOLOGICAL LITERACY 2. SUSTAINABLE LIFESTYLE

1.11.0 SAMPLE

For the present study, the institute will be selected through purposive sampling method i.e. Dayalbagh Educational Institute, Agra will be taken as the sample

50 students (comprising of 25 boys and 25 girls) of B.Ed. sem. IV will be selected through random sampling method from Dayalbagh Educational Institute, Agra will be taken as the sample

Rationale- as a quasi- experimental method is being used a sample of 50 is considered appropriate.

The sample design is as follows-

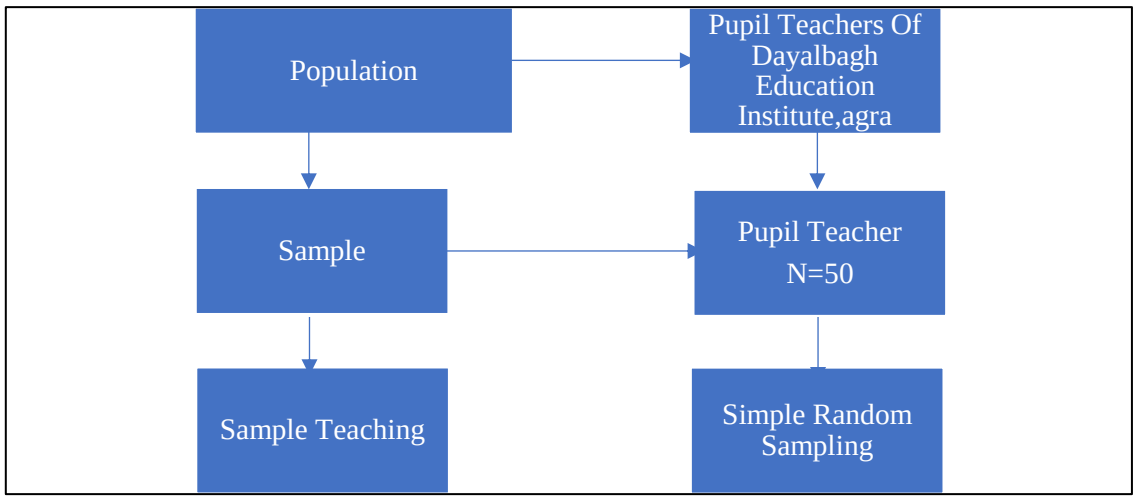

Fig. no.5 – Population Sample and Sampling Technique

1.12.0. TOOLS FOR THE STUDY

1 A tool for measuring sustainable lifestyle will be developed by the researcher.

2 The researcher will develop 20 modules of two hours each on Ecological literacy using Place based learning will be developed by the Researcher using place-based learning methods like real life problem solving, community engagement activities, connecting learning to surroundings, understanding local culture, etc.

2.13.0 STATISTICAL METHODS

Statistical Analysis will be conducted using Mean, Median, Mode, Standard deviation, Percentage analysis.

Parametric statistics - T test.

Qualitative analysis will involve the Pupils' observation by the researcher based on the behavioural changes and level of engagement with the environment.

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